

# Y2K Emergency Preparedness and Precautionary Posture

Prepared by Ian Nunn

Ontario Hydro Nuclear Year 2000 Project

For the OECD NEA International Workshop on the Impact of the Year 2000 on the Nuclear Industry  
February 1999

---

Emergency Preparedness (EP) and Precautionary Posture (PP) are parts of a larger risk management framework. However, they may also be developed and implemented as discrete components without developing the larger framework described in this paper. An overview of the Ontario Hydro Nuclear (OHN) risk management framework [3] is first presented. A short list of Year 2000 risks follows. Then, each component is discussed as a distinct process. Examples from OHN's approach to both are used to illustrate specific issues.

## OHN RISK MANAGEMENT FRAMEWORK

At OHN, we have divided Y2K risk into internal and external categories. For external risks, the business process has been used as the mechanism for assessing risk impact. The focus internally has been on the digital asset as a point of failure. OHN uses the following definition for *digital asset*:

A Digital Asset is defined as forms of computer hardware, software, operating systems, and applications for business, technical, security, facility management and process control systems. It includes all spare parts, documentation, maintenance agreements, instructions and training materials required to support, maintain and use the assets.

Internal risk has been further subdivided into project risk associated with the Y2K remediation project and non-Y2K project risk. Externally, distinction has been made between other Signature Business Units (SBUs) of Ontario Hydro and all other external stakeholders. Stakeholders include government (municipal, provincial, federal), regulators, industry organizations, suppliers, customers and the general public. These distinctions have been made to simplify planning and control. The chart below illustrates these categories.

### CATEGORIES OF RISK

<b>Risk Category:</b>	<b>External</b>		<b>Internal</b>	
<b>Source of Risk:</b>	OH External	Other SBU	Non-Y2K Project	Y2K Project
<b>Point of Failure:</b>	Business Process		Digital Asset	

For external risk, a business process analysis is conducted to identify critical business processes and critical dependencies both from other processes and relationships with stakeholders. The risk management process can then be subdivided into an assessment phase and a control phase. The four major steps for risk assessment are:

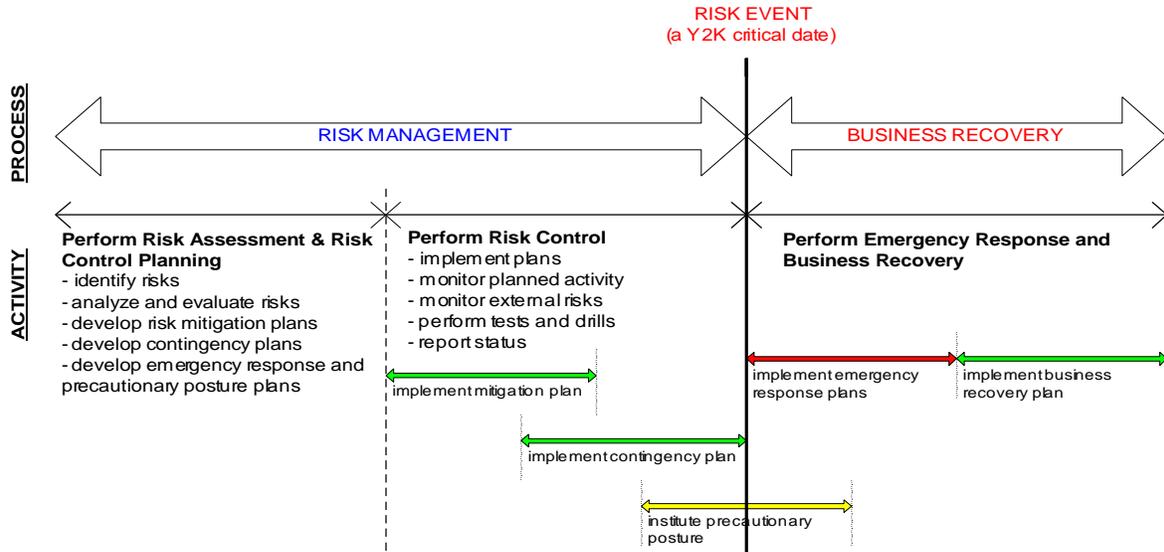
- Analyse the dependencies of the business process on resources and on other processes
- Identify risks of year 2000 problems that have the potential to cause the process to fail
- Analyse the impact of the failure and the likelihood of occurrence
- Set priorities for risk mitigation and contingency action so that limited time and resources may be applied to the mitigation of the most serious risk exposures

Risk control involves:

- Identifying risk mitigation and contingency options
- Evaluating the feasibility of risk mitigation and contingency options
- Developing plans and estimates for viable options, selecting options for action and developing detailed risk management action plans
- Developing a testing strategy, where feasible, which will demonstrate the effectiveness of the result of the risk management action
- Executing risk mitigation action plans
- Testing contingency plans
- Developing Y2K scenarios and modifying emergency preparedness plans accordingly
- Conducting emergency preparedness plans and drills
- Developing a Precautionary Posture
- Implementing the Precautionary Posture

The following chart illustrates the relationship of the major components of risk management as used by OHN.

# THE RISK MANAGEMENT PROCESS



The development of Emergency Response (ER) plans and a plan for the PP occurs in the initial Assessment and Planning phase. The implementation of the PP plan is over a period spanning the Y2K critical date. Implementation of ER plans, either nuclear or non-nuclear, occurs only if a significant event occurs at the Y2K critical time point.

## YEAR 2000 RISKS

The year 2000 presents a special set of risks:

- Internal operations
  - Systems and digital assets controlled by Ontario Hydro including process control systems, e.g.,
    - status and control information flows between CMO, Servco, Genco, and OHN, call centres, automatic message distribution services, shared digital devices, etc.
    - event logging processes (generally experience failures associated with the roll-over from 1999 to 2000)
- External operations, e.g.,
  - customers (other major power producers, municipal utilities, major retail customers)
  - suppliers (telecommunications services, fossil fuels, transportation services, banks, postal services, regulators, governments)
  - regulatory bodies and government (AECB, Ministry of Finance, Ministry of the Environment, Ministry of Natural Resources)

- Change and Year 2000 readiness re-verification processes when changes are made
- Liability Risks - arising out of business risks (customers, suppliers, regulators, general public, qualified financial statements)

Additionally, Year 2000 sources of risk have characteristics that are different from other sources of risk such as:

- Simultaneity - multiple process failures within a short time period
- Ubiquity - process failures in many locations because of common mode problems (if the main process fails, the back-up will often fail the same way)
- Duration - because of the scope for many failures in many places, outages may last longer than those allowed for in current response strategies

In addition, the North American Electric Reliability Council (NERC) has published a list of Y2K Risk Factors for the Bulk Electricity System (BES) [2]. A short list of other external risk factors is included.

## **PRECAUTIONARY POSTURE**

A Precautionary Posture is a defensive state that an organization goes into prior to the occurrence of an anticipated event and remains in effect until threat from the event has been reduced to an acceptable level. OHN is developing a PP that will include the PP requirements to be developed by NERC.

General features of a Precautionary Posture are

- Internal operations
- Increased surveillance
- Equipment and procedure test
- Special operating procedures
- Special staffing arrangements
- Schedule outages outside the PP periods
- Additional generation and transmission capacity
- Coordination of operating plans
- Heightened alert for Emergency Response Organization
- Return to normal operations

Procedures to cover each of these issues, described in detail below, must be created. The authority for initiating and managing the PP must be identified. Roles and responsibilities must be identified and assigned. All of this may be wrapped up in a plan.

### **Increased Surveillance**

The intention of increased surveillance is to monitor areas of known high residual risk while maintaining a general vigilance over all systems. This facilitates a rapid response to emerging situations.

Risk analysis applied to the business processes of an organization will reveal where the points of greatest risk lie. In the case of Y2K risk, digital equipment and systems are the point of failure within the organization. On the external side, failure of a business partner's or stakeholder's digital assets may interrupt the supply of a critical material or service causing failure of a critical business process.

An organization's Y2K repair project may end with some digital assets unrepaired or assets with a residual risk that could not be reduced below an acceptable threshold. In addition, experience shows that a small percentage of software and hardware repair projects still exhibit problems after prescribed testing is done. In larger organizations particularly, the possibility also exists that a digital asset was not inventoried and therefore not repaired. Each of these situations is an internal source of residual risk.

For external sources, it can be more difficult to assess the Y2K preparedness of a business partner on which one depends. In the case of material suppliers, the issue is the security of the entire supply chain for a particular product. Your supplier may be fully operational in the year 2000 but unable to obtain more of the material you depend on because of a failure in his supply chain.

In both cases, an increased level of watchfulness should be instituted prior to, during and immediately after the Y2K critical dates. Internally, attention should be directed to critical business processes and the digital assets that support them. This attention should be prioritized on the basis of greatest organizational impact in terms of safe operation and of processes and assets where known significant risk exists. Externally, attention should be directed to stakeholders on whom one is most critically dependent and with whom one has the lowest degree of confidence of success of their Y2K program.

### **Equipment and procedure tests**

Related to the surveillance of critical digital assets is the need for a checklist or plan to verify continued correct operation or operational readiness. This is not the exhaustive testing and quality assurance checking that accompanied the original Y2K repair effort. Rather, it is a short procedure or list of observations to be made about the asset's condition or state compared to its normal or expected state. A procedure for reporting and resolving variances is part of this readiness check.

Staffing requirements to maintain this posture should be identified early in 1999.

### **Special operating procedures**

As part of the remediation strategy for digital assets, special operating procedures may be required around the time of the Y2K date event. Other than the date roll-over for the century change and the leap year, no other date events are considered here. Each organization will decide which additional date events if any must be accommodated within these plans and procedures.

These procedures must be developed in the same detail as are standard operating procedures. Tests and drills must be conducted around them including special staffing requirements.

### **Special staffing arrangements**

A number of staffing arrangements should be considered including:

- Cancellation of all leave
- Augmented operations staff in place or ready
- Key maintenance staff ready
- Backup operations and maintenance staff on call
- Shift schedules prepared well in advance

Of the two most important Y2K critical dates New Years and leap year (Feb. 29, 2000), the new year of the next millennium will likely be universally popular as a holiday, particularly as it is a statutory holiday and associated with traditional extended leave in the Christmas season. Leave for all operations, maintenance and key support staff should be cancelled. Shift schedules for the additional personnel should be worked out well in advance.

### **Outages scheduled outside the PP periods**

Planned outages and regular maintenance should not be scheduled for periods that would include Y2K critical periods. This will prevent contention for scarce human resources that may be required to be on duty or on call during the PP period. This will also prevent contention for plant capacity that may be required for ready reserves.

### **Additional generation and transmission capacity**

One of the areas of significant risk exposure lies around the BES. Grid instability due to loss of generation, load and transmission facilities due to Y2K failure is a likely occurrence. Consequently, spare generation capacity in a ready state such as spinning reserves, should be part of the precautionary stance. This may be part of a larger plan covering all generation capacity.

The North American Electric Reliability Council (NERC) has outlined its role with respect to BES [4] as:

NERC will coordinate efforts to operate transmission and generation facilities in precautionary configurations and loadings during critical Y2K periods. Examples of precautionary measures may include reducing the level of planned electricity transfers between utilities, placing all available transmission facilities into service, bringing additional generating units on-line, and rearranging the generation mix to include older units with analog control. Another example is increased staffing at control centers, substations, and generating stations during critical periods. Fortunately, from an electric reliability perspective, New Years' Eve falls on Friday, December 31, 1999, and January 1 is a Saturday. Therefore, electric system conditions are likely to be favorable with level of electricity transfers at light levels and extra generating capacity available during the most critical period.

## Heightened alert for Emergency Response Organizations (EROs)

During the PP period, EROs may be placed in a standby status. All ER personnel should be familiar with Y2K specific scenarios as discussed below. As part of the ER plans for Y2K scenarios, local and regional Emergency Measures Organizations (EMOs) should be on some form of alert or in a precautionary status.

A backup communications contingency plan should have been developed and implemented prior to initiating the PP and the backup communications activated during the PP to support normal ER communications requirements.

## Return to normal operations

Any procedures required to move from the state of PP to a normal operating environment must be specified. The authority for initiating this transition must be identified. A decision must be made on what to do about any events that may occur due to Y2K failure. Postmortem analysis and follow-up action may be required.

## Other Issues

Other requirements may be incorporated in a PP as they arise. An example is the request below \

To:                   ECAR OP and Liaisons  
                          ECAR TSPP and Liaisons

The NERC Engineering and Operating Committees have requested that the Control Areas take four system snapshots for the 1998 New Year's Eve time frame. The specific dates and times are as follows:

- December 31, 1998 at 7 p.m. EST (midnight GMT)
- December 31, 1998 midnight EST
- December 31, 1998 midnight CST
- January 1, 1999 at 3 a.m. EST

This data will be used to establish a Y2K load flow base case(s) to perform a number of system studies at the Eastern Interconnection level for the Y2K problem.

## EMERGENCY PREPAREDNESS

Emergency Preparedness is a state an organization is always in and constitutes the planned response to a specified set of emergency conditions or disasters. Emergency Response Plans are activated after an undesirable event or condition has occurred and remain in effect until the effects of the event have been satisfactorily ameliorated or a longer term plan for disaster or business recovery can be implemented.

OHN has an ER plan in case of a nuclear emergency involving a radioactive emission [1]. In addition, various plans exist for non-nuclear emergencies including natural disasters and complete or partial failure of the grid. For Y2K events the major steps involved in EP for both nuclear and non-nuclear domains are:

- Identify existing authorities, plans, procedures, organizations
- Develop a set of Y2K risks and scenarios
- Update existing plans to respond to each scenario
- Create new plans as necessary
- Develop tests, exercises and drills
- Include stakeholders (EMOs, regulators, levels of government) as appropriate
- Management sign-off of process

In addition, if a full risk management program has not been instituted, the following components as described in the RM Framework of such should be developed:

- Identify and analyze Y2K risks to the EP process
- Develop risk mitigation and contingency plans, particularly around telecommunications
- Implement these plans as required

At OHN, contingency planning for backup emergency power and telecommunications to Emergency Operations Centres is underway. Modifications of ER plans will be made in the first half of 1999, followed by appropriate drills. Meetings with stakeholders and particularly the provincial government are ongoing. Coordination with NERC activities around EP is ongoing. Restoration planning in conjunction with NERC and the other Ontario Hydro SBUs will be part of a larger BES contingency plan.

## REFERENCES

- [1] Consolidated Ontario Hydro Nuclear Emergency Plan, N-PROG-RA-0001, April 14, 1998.
- [2] NERC Year 2000 Contingency Planning Guide Version 1.0, October 23, 1998,  
[ftp://www.nerc.com/pub/sys/all\\_updl/docs/y2k/contingency.pdf](ftp://www.nerc.com/pub/sys/all_updl/docs/y2k/contingency.pdf)
- [3] Ontario Hydro Year 2000 Program, Risk Management Framework, Release 2.1, November 5, 1998.
- [4] Y2k Coordination Plan for the Electricity Production and Delivery Systems of North America,  
<http://www.nerc.com/y2k/y2kplan.html>